

DIRECT TESTIMONY OF

HENRY E. DELK, JR.

ON BEHALF OF

DOMINION ENERGY SOUTH CAROLINA, INC.

DOCKET NO. 2021-2-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION WITH DOMINION ENERGY SOUTH CAROLINA, INC. (“DESC” OR “COMPANY”).

A. My name is Henry E. Delk, Jr., and my business address is 220 Operation Way, Cayce, South Carolina 29033. I am employed by DESC as Director, Power Generation.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND YOUR BUSINESS EXPERIENCE.

A. I graduated from Clemson University in 1993 with a Bachelor of Science degree in Mechanical Engineering and earned a Master of Business Administration from the University of South Carolina in 2000. I began my career with Milliken & Company in 1993 working as a Process Improvement Engineer. After three years, I accepted a position with Clariant Corporation as a Project Engineer.

1 I began my career with DESC, then South Carolina Electric & Gas Company,
2 in 1997 in the Rate Department as a Rate & Regulatory Specialist. In 2000, I
3 transferred to Electric Transmission and assumed a position within the System
4 Control department as a System Controller. Within Electric Transmission, I served
5 as Supervisor/Manager of Operations Planning from 2001 to 2007 and Manager of
6 System Control from 2007 to 2012. I transferred to the Electric Operations division
7 in 2012 to 2013 working as Manager of Northern Division Transmission Operations
8 and Local Manager of the Lexington and Chapin Crew Quarters. From 2013 to
9 2014, I served as Director of Power Marketing. I assumed the role of General
10 Manager, Fossil Hydro Technical Services in June 2014. In September 2017, I
11 assumed my current position.

12
13 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

14 A. The purpose of my testimony is to review the operating performance of
15 DESC's non-nuclear power generation units and South Carolina Generating
16 Company's ("GENCO") A.M. Williams Electric Generating Station ("Williams
17 Station") during the period January 1, 2020, through December 31, 2020 ("Review
18 Period").
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21

Q. PLEASE GIVE A SHORT DESCRIPTION OF DESC'S NON-NUCLEAR POWER GENERATION FACILITIES.

A. DESC currently operates three coal-fired steam units, one dual fuel (coal and/or natural gas) steam unit, three gas-fired steam units, 11 combined-cycle combustion turbine/steam generator units (gas/oil fired), 16 simple-cycle combustion turbines, four hydroelectric generating facilities, and one pumped storage facility. The total net non-nuclear summer and winter generating capability rating of these facilities is shown in Table 1 below. The ratings shown therein are updated on an annual basis.

Table 1

DESC Power Generation Capacity - Net Megawatts		
	Summer Rating	Winter Rating
Combined Cycle	1,829	1,994
Coal-Fired Steam	1,289	1,294
Dual-Fuel Coal and/or Gas-Fired Steam	415	415
Gas-Fired Steam	345	346
Simple Cycle Combustion Turbines	319	369
Hydroelectric	208	224
Pumped Storage Hydroelectric	576	576
Total	4,981	5,218

Q. DOES DESC OPERATE RENEWABLE GENERATORS?

A. Yes. DESC also owns and operates a thin film laminate solar generation system on ten acres of rooftop at Boeing's North Charleston production facility. This system has a DC nameplate rating of 2.6 MW. In addition to DESC-owned

1 renewable energy, the Company has also interconnected approaching 900 MW of
2 renewable energy under existing purchase power agreements.

3
4 **Q. PLEASE DESCRIBE GENCO AND ITS RELATIONSHIP TO DESC.**

5 A. GENCO owns Williams Station and was incorporated on October 1, 1984,
6 as a SCANA Corporation subsidiary. GENCO sells DESC the total capacity and
7 entire output from the Williams Station under a Unit Power Sales Agreement
8 approved by the Federal Energy Regulatory Commission. For purposes of this
9 testimony, I include Williams Station when I refer to DESC's coal-fired steam
10 plants.

11
12 **Q. HOW MUCH ELECTRICITY WAS GENERATED BY DESC IN THE**
13 **REVIEW PERIOD?**

14 A. In the Review Period, DESC generated 21,629,880 megawatt hours
15 ("MWH") of energy. That energy can be broken down as follows:

- 16 - the coal-fired steam units and the dual fuel steam unit (Cope Station)
17 when fired by coal generated approximately 17.7% of that amount;
18 - the combined-cycle units generated approximately 46.2%;
19 - the nuclear plant generated approximately 23.8%;

1 - the gas-fired steam units (Urquhart Unit No. 3 and McMeekin Unit
2 Nos. 1 & 2) and the dual fuel steam unit (Cope) when fired by natural gas generated
3 approximately 7.9%;

4 - the peaking gas turbines and hydro units generated approximately
5 4.3%; and

6 - the DESC-owned solar generation facility generated less than 1%.

7 By fuel, natural gas and fuel oil accounted for 54.4% of the total energy generated;
8 coal accounted for 17.6%; nuclear accounted for 23.8%; hydropower accounted for
9 4.0%; and DESC-owned solar accounted for less than 1%. Exhibit No. ____ (HED-
10 1) provides a graphic display of how the Company's generation met our customers'
11 demand for energy during this Review Period by generating unit type and by fuel
12 utilized.

13
14 **Q. PLEASE SUMMARIZE THE PERFORMANCE OF THE COMPANY'S**
15 **GENERATING UNITS.**

16 A. DESC's Power Generation facilities operated efficiently and dependably
17 during the Review Period. DESC's coal-fired and natural gas-fired steam units and
18 combined-cycle units (hereinafter collectively, "fossil units") had an availability
19 factor of 80.30% with an availability during the peak demand months of January,
20 February, June, July, August, and December of 91.65%.

1 During the Review Period, DESC's fossil units had a forced outage factor of
2 5.67%. When Wateree Unit 2 is excluded from this calculation, the forced outage
3 factor was 0.83% for the remaining units. The "forced outage factor" is the
4 percentage of the total hours that generating units are forced out of service (for
5 various reasons) compared with the number of hours in the period.

6
7 **Q. PLEASE DISCUSS THE SIGNIFICANT PROJECTS UNDERTAKEN**
8 **DURING DESC'S MAINTENANCE OUTAGES FOR THE REVIEW**
9 **PERIOD.**

10 **A.** As part of the Company's ongoing maintenance program, DESC undertook
11 a number of significant projects during its maintenance outages in this Review
12 Period. A brief description of major work is as follows:

13 **Cope Station – Spring 2020 - Outage Summary**

14 Cope completed a Spring 2020 planned outage beginning on February 19,
15 2020 and ending May 9, 2020. Major work completed during this outage included:
16 Generator Rotor Rewind, Low Pressure Turbine overhaul, High Pressure and Low
17 Pressure Turbine Bucket replacement, Boiler Reheat Tube replacements, Natural
18 Gas Bypass Duct tie in, Air Heater Expansion Joint replacement, High Energy Pipe
19 inspection, Coal Burner Assembly replacement, Closed Cooling Heating Exchanger
20 cleaning and Battery load testing. A 42-day maintenance outage (May 9, 2020 –
21 July 23, 2020) followed the planned outage to perform shop necessary repairs to the

1 Low-Pressure Turbine Rotor which were discovered during the inspection
2 process. Cope personnel completed all outage work safely with no recordable
3 injuries and no environmental incidents.

4 **Williams Station – Spring 2020 – Outage Summary**

5 Williams completed a Spring 2020 planned outage beginning March 22,
6 2020 and ending April 13, 2020. Major work completed during this outage
7 included: Boiler Tube repairs, Auxiliary Boiler tuning, Service Water Line repairs,
8 and Valve repairs. Williams personnel completed all outage work safely with no
9 recordable injuries and no environmental incidents.

10 **Urquhart Station – Fall 2020 – Outage Summary**

11 Urquhart Station completed a Fall 2020 planned outage beginning on
12 September 6, 2020 and ending on October 10, 2020 for Units 6 & 2 and October 14,
13 2020 for Units 5 & 1. The major work completed during these outages included:
14 Unit 5 Hot Gas Path, Unit 1 Steam Turbine Valve inspection, Units 5 and 6 Closed
15 Cooling Tower replacement and Heat Recovery System Generator Drain Valve
16 replacement; Unit 1, 2, 3, 5, and 6 Human-Machine Interface upgrade, and High
17 Energy Pipe inspection. Urquhart personnel completed all outage work safely with
18 no recordable injuries and no environmental incidents.

19 **Wateree Station - Fall 2020 – Outage Summary**

20 Wateree Unit 1 completed a Fall 2020 planned outage beginning on
21 September 12, 2020 and ending on November 20, 2020. Major work completed

1 during this outage included: Low Pressure Feedwater Heater replacements,
2 Asbestos abatement, Coal System refurbishment, Selective Catalytic Reduction
3 catalyst replacement, Forced Draft Fan Outlet Damper replacement, Heater
4 Extraction Bellows and Condenser Horizontal Expansion Joint replacement,
5 Auxiliary Boiler Superheat Tube replacement, Absorber Agitator replacements, and
6 Absorber Spray Header Piping replacement. Wateree personnel completed all
7 outage work safely with no recordable injuries and no environmental incidents.

8 **Cope Station – Fall 2020 - Outage Summary**

9 Cope completed a Fall 2020 planned outage beginning on October 1, 2020
10 and ending October 30, 2020. This outage was for the tie-in of the new
11 Baghouse. Cope personnel completed all outage work safely with no recordable
12 injuries and no environmental incidents.

13 **Columbia Energy – Fall 2020 – Outage Summary**

14 Columbia Energy Center completed a Fall 2020 planned outage beginning
15 on September 25, 2020 and ending on December 6, 2020. The major work
16 completed during this outage included: Steam Turbine major overhaul and Controls
17 upgrade; Unit 1 and Unit 2 Turbine Inlet Air Piping installation, Ammonia Header
18 Valves and Piping installation, Brush Rigging replacement, Condensate Pump
19 replacement and Motor refurbishment, and Heat Exchanger upgrade; Unit 1 and
20 Unit 2 Heat Recovery Steam Generator Desuperheater replacement, and
21 Insulation/Pen Seals and Transition replacement; Unit 1, Unit 2 and Unit 3

1 Hydrogen Dryer installation; Cooling Tower Fill and Drift Eliminator replacement,
2 Cooling Tower Bleach Tank replacement and High Energy Pipe
3 inspections. Columbia Energy Center personnel completed all outage work safely
4 with no recordable injuries and no environmental incidents.

5 **Williams Station – Fall 2020 – Outage Summary**

6 Williams completed a Fall 2020 planned outage beginning on November 28,
7 2020 and ending on December 24, 2020. Major work completed during this outage
8 included: Condenser Expansion Joint repairs, Turbine Valve Start Up Screens
9 removal, Air Heater Support Bearings replacement, Ammonia Vaporizers
10 replacement, Coal Mills refurbishment, and Relay testing. Williams personnel
11 completed all outage work safely with no recordable injuries and no environmental
12 incidents.

13
14 **Q. PLEASE DISCUSS ANY SIGNIFICANT FORCED OUTAGES FOR THE**
15 **PERIOD UNDER REVIEW.**

16 **A.** DESC's Power Generation group defines a significant forced outage as any
17 forced outage in excess of seven days for a generation facility with more than 100
18 megawatts of generating capacity. DESC had three significant forced outages
19 during the Review Period:
20
21

1 **Wateree Unit 2**

2 Wateree Unit 2 experienced a forced outage beginning on February 19, 2020
3 when a hydrogen/air mixture resulted in a small explosion causing damage to the
4 stator section of the main generator. This unit remains out of service while repairs
5 are being made.

6 **McMeekin Unit 2**

7 McMeekin Unit 2 experienced a forced outage on May 17, 2020 due to the
8 failure of a vacuum pump on the condenser. This pump had to be removed from
9 service and sent out to a shop for repairs. The unit returned to service on May 28,
10 2020.

11 **Urquhart Unit 2**

12 Urquhart Unit 2 experienced a forced outage on October 10, 2020 due to
13 the failure of a generator breaker. This breaker was removed from service and
14 relay settings were changed to allow for continued operation of the unit in a
15 derated condition using a single breaker until a replacement was able to be
16 installed. The unit was returned to service on October 22, 2020.

17
18 **Q. WHAT WAS DESC'S FOSSIL SYSTEM FORCED OUTAGE FACTOR FOR**
19 **THE PERIOD UNDER REVIEW?**

20 **A.** For the Review Period, DESC's fossil units experienced a system forced
21 outage factor of 5.67%. When Wateree Unit 2 is excluded from this calculation, the

1 forced outage factor was 0.83%. DESC's forced outage factor of 22.51% for coal-
2 fired units was largely driven by the Wateree Unit 2 outage; when this unit is
3 excluded from the data, DESC's coal units had a forced outage factor of 0.66%,
4 which compares extremely favorably to the five-year (2015-2019) national average
5 of 5.11% for forced outage factors on all coal-fired units as reported by the North
6 American Electric Reliability Council ("NERC") Generating Availability Data
7 System database. DESC's forced outage factor of 0.61% for its combined-cycle
8 units was much lower than the five-year (2015-2019) NERC national average for
9 combined-cycle units of 2.24%. DESC's gas-fired steam units forced outage factor
10 of 1.80% for the Review Period was much better than the five-year (2015-2019)
11 NERC national average of 5.24% for gas-fired steam units.

12
13 **Q. PLEASE DISCUSS THE AVAILABILITY OF DESC'S FOSSIL PLANTS**
14 **DURING THE REVIEW PERIOD.**

15 A. Availability factor is a measure of the actual hours that the generation units
16 are available (overall readiness to provide electricity) divided by the total hours in
17 the Review Period. Availability is not affected by how the unit is dispatched or by
18 the demand from the system when connected to the grid. However, it is impacted
19 by the planned and unplanned shutdown hours. DESC's fossil units had an
20 availability factor of 80.30% during the Review Period.

1 For comparison purposes, the five-year (2015-2019) NERC national average
2 for availability from all coal-fired units was 82.44%; DESC's availability for its
3 coal-fired units for 2020 was 54.14% primarily due to lengthy planned outage work
4 at Cope, Wateree, and Williams Stations, along with the failure of the Wateree Unit
5 2 generator. DESC's combined-cycle availability factor of 86.19% was in line with
6 the five-year (2015-2019) NERC national average for combined-cycle units of
7 88.05%. DESC's gas-fired steam units' availability factor of 93.61% for the Review
8 Period compared favorably with the five-year (2015-2019) NERC national average
9 of 80.87% for gas-fired steam units.

10
11 **Q. PLEASE EXPLAIN "HEAT RATE" AND DESCRIBE THE HEAT RATE OF**
12 **THE NATURAL GAS-FIRED COMBINED CYCLE UNITS AND THE**
13 **COAL-FIRED STEAM UNITS DURING THE REVIEW PERIOD.**

14 **A.** Heat rate is a way to measure the thermal efficiency of a power plant. It is
15 the number of British Thermal Units ("Btu") of fuel required to generate one
16 kilowatt-hour ("kWh") of electricity. Simply put, the lower the heat rate, the more
17 efficient the plant.

18 The natural gas-fired combined cycle unit average system heat rate for the
19 Review Period was 7,467 Btu/kWh. Columbia Energy Center had the best heat rate
20 on our system at 7,207 Btu/kWh. The most recent data published by the United

1 States Energy Information Agency (“EIA”) indicates that the national average heat
2 rate for all natural gas-fired units in 2019 was 7,732 Btu/kWh.

3 The coal-fired steam unit average system heat rate for the Review Period was
4 10,276 Btu/kWh. Cope Station had the best heat rate for a coal-fired unit on our
5 system at 9,924 Btu/kWh. For comparison purposes, the most recent data published
6 by EIA indicates that the national average heat rate for all coal-fired units in 2019
7 was 10,551 Btu/kWh.

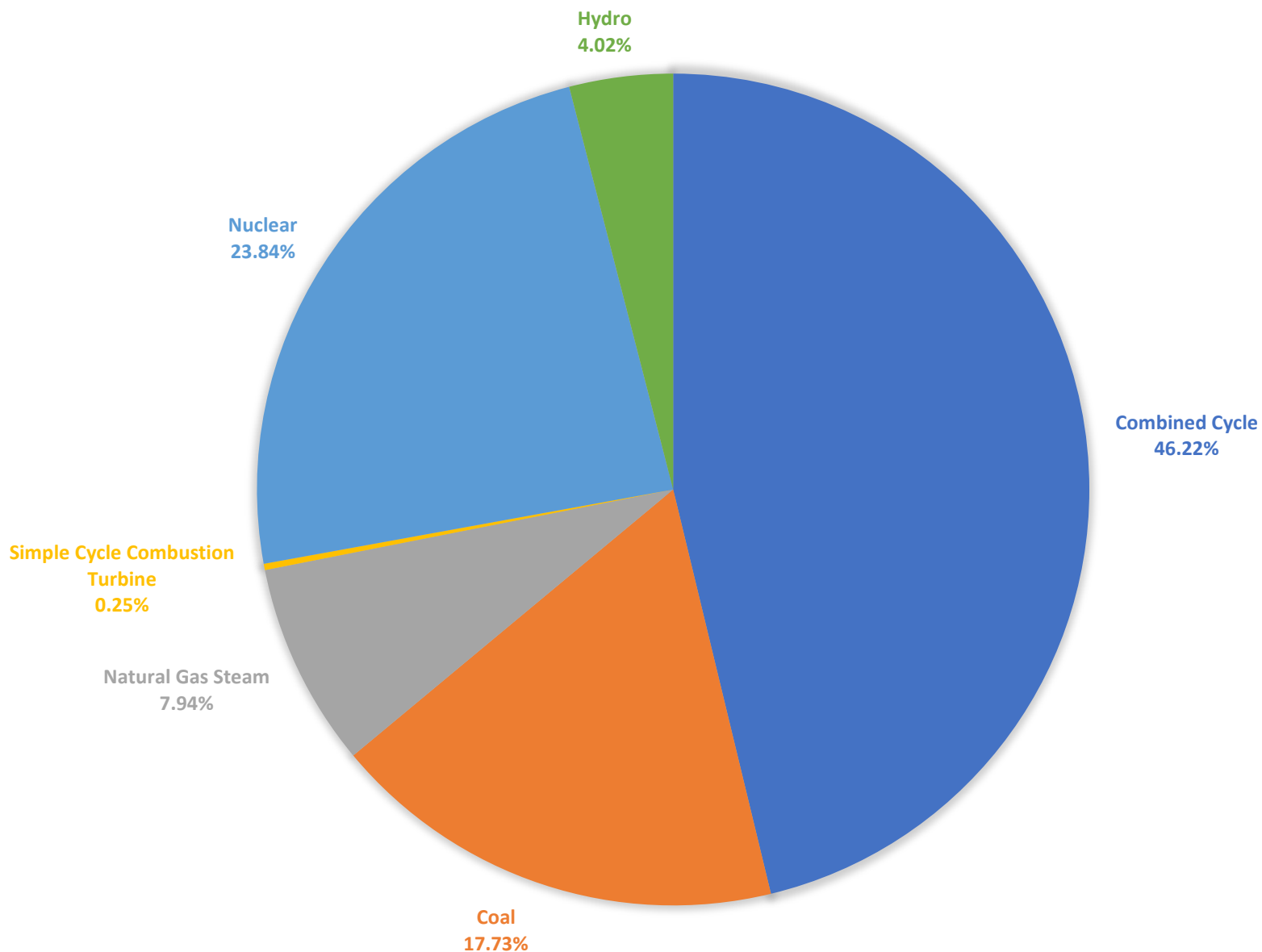
8
9 **Q. WHAT ARE YOU REQUESTING OF THE COMMISSION IN THIS**
10 **PROCEEDING?**

11 A. The Company seeks approval of its fuel adjustment as requested.

12
13 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

14 A. Yes.

2020 DESC OWNED GENERATION OUTPUT BY UNIT TYPE



2020 DESC OWNED GENERATION OUTPUT BY FUEL

